

Newsletter

Week of Feb. 13, 2006

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Lab trainer crosses borders to help others learn

Dan Gabel of Enterprise Support and Computer Education (IM-2) recently returned from a trip to a remote coal mining community in the mountains of northwestern China where he taught conversational English to Chinese middle school teachers. Page 8



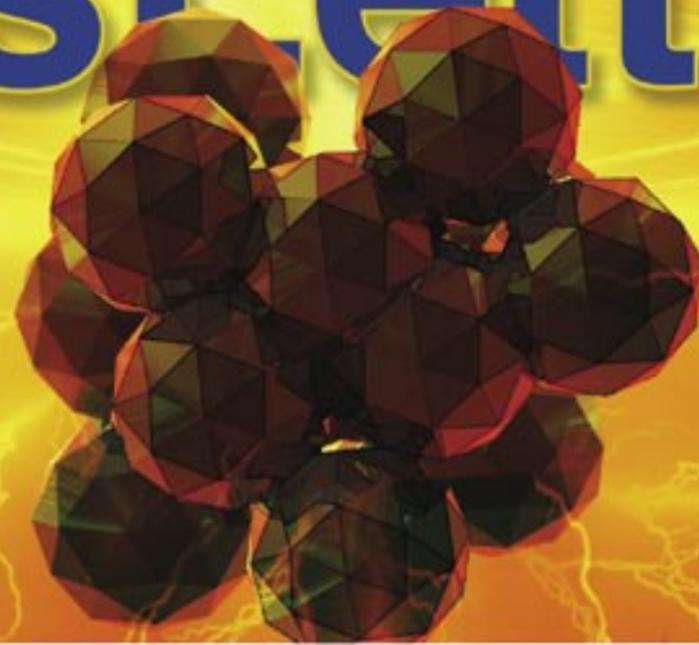
The senior management team for Los Alamos National Security, LLC, the new management contractor for the Laboratory, recently was announced (see the week of Jan. 30 LANL Newsletter). What issue or issues would you personally like to see addressed first by the new Laboratory management team when it takes over June 1? Learn what your co-workers had to say on Page 6.

Los Alamos
NewsLetter

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Tiny crystals promise big benefits for solar technologies

by Todd Hanson

Los Alamos scientists have discovered that a phenomenon called carrier multiplication, in which semiconductor nanocrystals respond to photons by producing multiple electrons, is applicable to a broader array of materials than previously thought. The discovery increases the potential for the use of nanocrystals as solar cell materials to produce higher electrical outputs than current solar cells.

In papers recently published in the journals *Nature Physics* and *Applied Physics Letters*, the scientists demonstrate that carrier multiplication is not unique to lead selenide nanocrystals, but also occurs with very high efficiency in nanocrystals of other compositions, such as cadmium selenide. In addition, these new results shed light on the mechanism for carrier multiplication, which likely occurs via the instantaneous photoexcitation of multiple electrons. Such a process has never been observed in macroscopic materials and it explicitly relies on the unique physics of the nanoscale size regime.

According to Richard Schaller of Physical Chemistry and Applied Spectroscopy (C-PCS), "Our research of carrier multiplication in previous years was really focused on analyzing the response of lead selenide nanocrystals to very short laser pulses. We discovered that the absorption of a single photon could produce two or even three excited electrons. We knew, somewhat instinctively, that carrier multiplication was probably not confined to lead selenide, but we needed to pursue the question."

Lead project scientist Victor Klimov of C-PCS explains, "Carrier multiplication actually relies upon very strong interactions between electrons squeezed within the tiny volume of a nanoscale semiconductor particle. That is why it is the particle size, not its composition that mostly determines the efficiency of the effect. In nanosize crystals, strong electron-electron interactions make a high-energy electron unstable. This electron only exists in its so-called 'virtual state' for an instant before rapidly transforming into a more stable state comprising two or more electrons."

The Los Alamos findings point toward practical photovoltaic technologies that may utilize such traditional solar cell materials as cadmium telluride, which is very similar to cadmium selenide. Other interesting opportunities also may be associated with the use of carrier multiplication in solar-fuel technologies and specifically, the production of hydrogen by photo-catalytic water splitting. The latter process requires four electrons per water molecule and its efficiency can be dramatically enhanced if these multiple electrons can be produced via a single-photon absorption event.

In addition to Klimov and Schaller, the Los Alamos team includes Melissa Petruska, also of C-PCS. Research on carrier multiplication at Los Alamos is funded by the Department of Energy's Office of Basic Energy Sciences and by Los Alamos' Laboratory-Directed Research and Development program. More information on Los Alamos quantum dot research is available at <http://quantumdot.lanl.gov> online.

A stroke is an emergency

Stroke is a leading cause of death in our society, but a recent survey by the Canadian Stroke Network showed that less than half of the adults surveyed know its symptoms. More than a third said they wouldn't treat stroke symptoms as a medical emergency.

In a stroke, blood flow to or in the brain is suddenly interrupted. The sooner the person receives medical care, the better the chances for effective treatment. If one observes anyone displaying the symptoms of a stroke, call 911.

The most common symptoms of a stroke include

- Confusion and sudden difficulty in speaking or understanding.
- Sudden weakness or numbness in the face, arm or leg on one side of the body.
- Sudden trouble seeing with one or both eyes.
- Abrupt loss of balance or coordination.
- Dizziness or sudden trouble walking.
- Abrupt severe headache with no known cause.

Other important but less common symptoms, include

- Loss of consciousness
- Coma
- Fainting
- Convulsions
- Nausea, vomiting and fever that develop unusually fast (in minutes or hours instead of the several days needed by an infection).

If you or someone you work with has one or more stroke symptoms that continue for more than a few minutes, immediately call for an ambulance. Take note of the time when symptoms or warning signs begin. The medical personnel will need this information. Remember, not all of the warning signs accompany every stroke. Don't ignore symptoms, even if they disappear.

Los Alamos National Laboratory NewsLetter

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Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission.

Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the Cold War. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.



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Editor's note: The following is the text of an after-dinner message delivered Dec. 9, 2005, by Laboratory Director Bob Kuckuck to senior managers and their spouses. In his remarks, the director parallels the Laboratory's current transition with that which occurred 60 years ago, highlighting the positive outcome of the post-war changes. At that time, World War II had concluded, and the future of the facility and those involved in the secret project on the Pajarito Plateau was yet to be determined.

It is Dec. 9 ...

by Bob Kuckuck

Let me paint a picture for you this evening. It is Dec. 9 ...

- Two days ago Laboratory employees honored the anniversary of Pearl Harbor, an event that gave added impetus to the very creation of this laboratory.

- There is much angst about the future of the Laboratory. Who will manage it? Who will the people be working for?
- There is great concern for the ability to do good science. Some scientists even believe that increasingly restrictive security rules may soon make it impossible for them to work.
- Good people are leaving.
- The new director has been here a very short time.
- The previous director was here for only 30 months.
- Stability is an issue.
- Tension is high.
- The questions being asked most are "where are we headed" and "how do we best get there?"



Bob Kuckuck

As I said, it is Dec. 9. Dec. 9, 1945! Exactly 60 years ago this evening! The Coordinating Council of the Los Alamos Laboratory could have been meeting right here in this room. Dorothy McKibbin was still running our Santa Fe office a few blocks from here at 109 East Palace. People in Northern New Mexico were only just becoming aware of what all that activity going on up on 'The Hill' was all about.

- The Pearl Harbor anniversary I mentioned was only the fourth one. Memories were still very fresh and evoked strong emotions. Some people could probably still quote the number of men and women who died and the names of many of the ships that were lost.
- This evening, Dec. 9, was only four months to the day after the Laboratory's plutonium creation was dropped on Nagasaki — the ultimate finale to the Manhattan Project.
- [J. Robert] Oppenheimer had left the Laboratory to return to the University of California only a few weeks after VJ Day, on Oct. 16.
- Norris Bradbury had been director for only 54 days.
- Many scientists, like Oppenheimer, had returned to their campuses in September. [Hans] Bethe and [Enrico] Fermi remained for only a few months longer.
- No legislation concerning the future of Los Alamos, or even atomic energy, was yet pending in Congress. General Leslie Groves had created Los Alamos by fiat and in secret. He was now keeping it alive of his own volition. There was talk of a "commission" that would take responsibility, but nothing yet existed. And there was much angst as to the potential quality of any such commission.
- The future of the University of California's involvement was unknown. Its current involvement was merely an artifact of the Manhattan Project.
- Soldiers were leaving; many remaining civilians were indifferent to the future of Los Alamos. Many others had strongly different views and philosophies as to its future.
- Morale was extremely low.

I think it is obvious why I have painted this picture of the past for you this evening. The parallels with our situation and uncertainties of today at Los Alamos are numerous and almost uncanny.

And while we may not yet know the exact resolution of our uncertainties today, we do know the extraordinarily positive outcome of the uncertainties of 1945. We know that the "project" went on to become a world-class scientific laboratory. We know that after bringing an end to World War II, a three-year "hot war," this laboratory went on to play a crucial role in also bringing to a successful conclusion the 42-year "Cold War." The Laboratory grew tenfold and adapted well to the vastly different challenges of these two wars and the changing times. I think we can take comfort in the demonstrated viability and adaptability of this institution and confidently project a positive future for today's Laboratory as well.

Let me take this evening's analogy to an even finer level of detail.

The [then] new director, Norris Bradbury, presented his vision for the Laboratory's path forward to his senior managers in October of 1945. He had three basic assumptions:

- Los Alamos would prevail.
- Weapons work would continue.
- Staff would be reduced by two-thirds.

He also articulated a philosophy for success in the coming transition:

- "Turn over [to the new management] the best project possible."
- Acquire and retain "the best men."
- Reduce the staff by two-thirds.

While we are perhaps more fortunate in that we are not facing the downsizing that Bradbury was, the other assumptions and philosophies match ours precisely. It is an interesting aside that Bradbury's downsizing assumption was driven by the available housing in Los Alamos at the time. He reasoned that as he had 488 units for family housing, he could accommodate a like number of staff and estimated that 25 percent of the spouses also would work at the Laboratory. This accounted for about 600 married civilian employees. He also

continued on Page 3

Agreement reached on Appendix F

Simplified performance-evaluation process for remainder of UC contract

by Bill Wadt, Prime Contract Office leader

The University of California and the Los Alamos Site Office of the National Nuclear Security Administration have reached agreement on an Appendix F for the remainder of the current UC contract and on a simplified performance-evaluation process. NNSA Administrator Linton Brooks specifically directed the Site Office to develop a simplified process for Appendix F so the Laboratory could focus on a successful contract transition, while still fulfilling its mission and operational requirements.

Appendix F for fiscal year 2006 provides for three objectives focusing on mission, compliance and transition. The Laboratory will report to the Site Office on these objectives at three bi-monthly meetings beginning this week [Feb. 15]. At the end of the transition period, the Site Office will issue a report, approved by Brooks, documenting its evaluation of the university's performance. Evidence for their evaluation will come from portfolio reviews of the director, external division and program-review committee reports, and the three Appendix F meetings. As Brooks has stated, UC and the Laboratory will not have to generate an Appendix F self-assessment this year.

Mission performance (Objective 1) evaluation will be based on meeting major NNSA weapons and infrastructure deliverables (Level

1 and 2 milestones), implementing an integrated threat reduction program, maintaining a strong science, technology and engineering base and supporting key NNSA weapons complex program planning. Work in support of national security strategic objectives remains the primary focus of the Laboratory.

Compliance performance (Objective 2) will be based on execution of the Operational Efficiency Program, the Security Annual Operating Plan, environmental management and business systems. The detail behind these areas reads much like last year's objectives and measures: ISM, conduct of operations, quality assurance, safety authorization basis, ISSM, the Consent Order with the New Mexico Environment Department, environmental compliance, finance, property, procurement, human resources and the Enterprise Project. Compliance with federal law and Department of Energy orders to ensure a safe and secure work environment to carry out our mission objectives is still a given.

Objective 3 deals with transition issues and specifically addresses activities that ensure a smooth transfer of site-management responsibilities and authorities to the new Laboratory management and operations contractor, Los Alamos National Security, LLC. Transition teams from the Laboratory, the Los Alamos Site Office and LANS are coordinating efforts on a daily

basis to minimize disruption to the work force and to mission and operations while minimizing cost to the government.

A base fee of \$5.8 million will be provided to the university for the period of the contract extension covering Oct. 1, 2005, to May 31, 2006. However, the conditional payment-of-fees clause is still in effect, and occurrences of significant safety and security violations could reduce the base fee.

The 2006 fiscal year Appendix F contract modification can be accessed at pco.lanl.gov/ online.

Dec. 9 ...

continued from Page 2

conjectured an approximate one-to-one ratio of unmarried to married employees, hence another 500 or so civilians. This would provide a total post-war staff of about 1,100, down from the 1945 level of about 3,000.

There are other interesting parallels between our respective challenges.

- We of course, have a Stockpile Stewardship Program with a strong surveillance component. Bradbury envisioned the same: "... We will set up a more careful program of gadget testing so that we will know the degree of reliability of each component. We will set up surveillance tests ..."
- We have a Reliable Replacement Warhead (RRW) Program. Bradbury envisioned the same: "We will initiate engineering of a new weapon whose aims should be ... increased reliability, ease of assembly, safety and performance; in short, a better weapon."
- We have a Non-Proliferation Program. Bradbury envisioned the same: "We will propose subsequent Trinities [nuclear tests] ... Properly witnessed, properly publicized, further [Trinities] may convince people more than any manifesto that nuclear energy is safe only in the hands of a wholly cooperating world."
- Bradbury also had an interesting perspective on research on a "hydrogen" bomb: "We will propose that the fundamental experiments leading to the answer to the question 'Is or is not a Super (H-Bomb) feasible?' ... This does not mean we will build a Super. It couldn't happen in our time in any event."

Another interesting parallel in our respective challenges is the matter of working

hours. We have just instituted an alternate work schedule at the Laboratory to allow a better work-life balance for employees. Bradbury was addressing a parallel, although perhaps more demanding situation: "The matter of a 40-hour work week. This is under discussion at the moment — when do we get to it, I don't know."

So what do we take from the comparison of our respective Decembers — 1945 versus 2005? I think today's prognosis for the future is the same as the reality of the post-1945 period:

- Los Alamos will prevail and will always be essential to the nation's security.
 - Bradbury's "Good men" (great people, men and women) will cause the Laboratory to excel.
- Our own philosophy for transitioning also has been tested by Bradbury and shown to be successful:
- Focus on our mission — continue our weapons work.
 - Take care of our people and our science.
 - Hand to the next managers the best laboratory possible.

We are ready to take this laboratory to the next level of performance in providing science for the public good. Bradbury and his team were the beginning of the University of California era — great people with commitment. Many followed for 60 years. We are the closers of the UC era. They, the starting pitchers; we, the closers to assure the victory.

We will close this era with pride and honor! I am proud to be here working with all of you.

Reference for the 1945 information:
Project Y: The Los Alamos Story, Part II, Ed. Edith C. Truslow and Ralph Carlisle Smith, 1983, American Institute of Physics and Tomash Publishers.

Working for others (and ourselves)



by Tom Bowles,
chief science officer

Our Work for Others research provides benefits not only to our WFO sponsors but also to the Lab in general. This fact is recognized by Laboratory management, as well as by the National Nuclear Security Administration. Ambassador Brooks has noted many times how important WFO is in maintaining capabilities that are necessary to support the NNSA mission. In fact, a strong WFO program is one of the assumptions in planning for the future of the nuclear weapons complex.

Our WFO portfolio is quite broad. It includes more than a dozen sponsors ranging from space sciences and biosciences to defense and nonproliferation. And of course, while technically not WFO, we have a strong Office of Science (SC) portfolio at the Lab that is a vital component in maintaining our scientific strengths. These programs provide the additional breadth and depth of capabilities that are required to keep [the Laboratory] positioned to quickly respond to new opportunities and emerging threats. A critically important part of our ability to respond quickly is our ability to attract and retain the most talented scientists and engineers. The science and engineering (S&E) challenges that our WFO/SC portfolios provide are a very effective drawing card in maintaining a world-class workforce.

So what does the future look like? It seems likely that the nation's nuclear weapons efforts will either decrease somewhat in the future (or at best stay constant). It also is pretty clear that funding in the broader arena of national security will increase. There also is an initiative being driven by the president and Congress to reinvigorate science and engineering in the United States. Thus, the outlook for increased funding for the S&E that underpins our ability to carry out the Laboratory's missions is more positive right now than it has been for a long time. The Laboratory always has pushed to maintain a strong R&D base that provides our ability to deliver on mission. And from public comments made by Bob Kuckuck and Mike Anastasio, it is clear the Lab is committed to a strong WFO/SC effort.

Los Alamos Transition Project information

Editor's Note: Rich Marquez, leader of the Transition Team, writes a weekly column on the transition project that is posted to the Transition Web site at transition.lanl.gov. Following are his last two messages.

Focus on people

Jan. 30 — As was set out in my Jan. 12, 2006, weekly message, the first part of LANS' transition process focuses on people. Understandably, during this transition time, many employees are wondering where they might fit in to the new Laboratory organization on June 1. Ultimately, it will be up to LANS to determine how to map current personnel to an organizational structure.

With respect to personnel mapping, you should know that the Laboratory Transition Team is working with LANS personnel to help ensure the mapping process will not interfere with work or deliverables. Part of the mapping process includes briefings by our line and program managers to help LANS better understand specifically how the Laboratory delivers its mission, science and operational commitments to our customers. Given this, employees should not read anything into the fact that they did or did not participate in meetings with LANS team members. In fact, many or even most employees will not ever directly participate in the mapping process.

The mapping process is one of two critical steps that need to be accomplished so that LANS can develop offer letters of employment by mid-March. The other critical item that will be part of the offer letter is finalizing the pension and benefits package. LANS delivered its proposed package to NNSA on Jan. 25, 2006. With respect to that proposed package, The National Nuclear Security Administration (NNSA) has provided a process that will allow Laboratory employees and retirees an opportunity to comment on the "substantial equivalency" of the retirement and benefits plan proposed by LANS. The comment period augments the 60-day consideration period promised by Source Evaluation Board Chairman Tyler Przybylek and provides extra time for employees to consider and better understand the concepts of the plans.

During the transition process, there may be times when it feels like there are more questions than answers, especially in the HR arena, an area that impacts each of us very personally. Please know that we will make every attempt to provide accurate and complete information as it becomes available. Also know that each entity involved,



— LANL, LASO and LANS — is committed to a successful transition.

In the next weekly message, I will try to communicate a calendar of transition events that might be of general interest to Laboratory employees. In the meantime, let me remind each of you of LANL Transition Team points of contact:

- James Peery, PADNWP, Mission and Science
 - John Bretzke, ADTS, Operations
 - Carolyn Zerkle, ADA, Business
 - Bill Wadt, PCO, Closeout
 - Micheline Devaurs, DDNS, Managing Change
 - David McCumber, CER, Communications
 - Lynn Boland, HR, Human Resources
- Please feel free to contact these points of contact if you have questions regarding transition activities.

The road ahead

Feb. 7 — In response to your suggestions, the Laboratory Transition Team has modified the Transition Web site to make information more accessible. In addition to more prominent displays of the latest answers to frequently asked questions (FAQs) and a direct link to transition questions and answers from Los Alamos National Security, LLC (LANS), the site now includes a timeline where people can see where the Laboratory is in the six-month transition process.

As I indicated in my last weekly message, I thought it would prove helpful to set out events that will be of key interest to employees and retirees in the coming weeks. As the timeline shows, LANS transition team members continue to focus on people. In the weeks ahead, LANS personnel will continue mapping the current Laboratory work force with mission, science, operational and business commitments in mind.

As you are aware, LANS has delivered its benefits package to the National Nuclear Security Administration (NNSA) for approval. Next week, employees and retirees will have their first opportunity to see the proposed

benefits package. The benefits package will be posted on the NNSA, LANS and LANL transition Web sites prior to the all-employee meeting on Thursday, Feb. 16, from 9:30 to 11:30 a.m. in the Administration Building Auditorium at Technical Area 3. The meeting will also be broadcast on LABNET.

Then, on Thursday, Feb. 16, from 6 to 8 p.m. at the Duane W. Smith Auditorium at Los Alamos High School, retirees, employees and Los Alamos community members will get a chance to see the proposed packages during the first of three community meetings.

Similar community meetings are scheduled for Feb. 21 at the Santa Fe Community College in Santa Fe and Feb. 22 at the Carlos F. Vigil Middle School Auditorium in Española. Check the Daily NewsBulletin and the Transition Web site for more information about these important events, which provide opportunity to receive information on the "substantial equivalence" of the proposed benefits package.

Other near-term activities in the works include preparations for LANS to begin moving into the "Places" phase of the transition process. As you recall from my Jan. 12 weekly message, during this phase, LANL will support LANS on facility condition assessments, inventories and other activities to document existing conditions at the Lab. In preparation, the Transition Operations sub-team is planning for walkdowns of facilities sometime after the mid-March time frame. As could be expected, LANL Transition Team members will work with LANS beforehand to minimize impacts to ongoing mission, science and operational activities.

In addition, because relations with our regional neighbors are extremely important, LANL personnel in the coming weeks will continue to work closely with LANS personnel to help ensure that the transition does not adversely affect the regional economy.

Every Laboratory employee can do his or her part in ensuring a smooth transition by continuing to focus on delivery of mission, science and support commitments to all internal and external customers. In doing so, we can strive to make the changeover on June 1 as seamless as possible.

Benefits meetings

The National Nuclear Security Administration will host a series of poster board meetings at which the Lab's new contractor, Los Alamos National Security, LLC, will present Laboratory employees with the pension/benefits plan it is proposing. NNSA will take comments on whether the proposed plan meets the "substantially equivalent" requirement of the LANS contract.

The meetings will be held on the following dates at the times and locations listed:

- Feb. 16 — Los Alamos, 9:30–11:30 a.m., Administration Building Auditorium (badgeholders only)
- Feb. 16 — Los Alamos, 6–8 p.m., Los Alamos High School
- Feb. 21 — Santa Fe, 6–8 p.m., Santa Fe Community College
- Feb. 22 — Española, 6–8 p.m., Carlos F. Vigil Middle School Auditorium

For more information, see a NNSA news release at www.lanl.gov/news/newsbulletin/pdf/NNSA_Benefits_012506.pdf online.

For the latest information on meeting locations, check the Transition Web site at transition.lanl.gov.

On-line resources for information about the Laboratory's contract transition



transition.lanl.gov



lansllc.com/index.html



www.doeal.gov/LASO

Los Alamos, LSU Hurricane Center join forces

by Nancy Ambrosiano

Understanding hurricanes and their effects is a specialty for Louisiana State University's Hurricane Center, and now they will have an additional set of tools and scientific expertise with which to work. An agreement signed in Los Alamos will team members of the Laboratory's Decision Applications (D) Division with LSU Hurricane Center staff to join forces against the worst storms nature can offer.

The new partnership, through a memorandum of understanding, will allow the two sets of specialists to embark on joint hurricane research projects in their particular fields. Los Alamos has proven expertise in large-scale computer modeling and simulation applied to population mobility, critical infrastructure protection and the interrelationships that can come crashing down in hurricane conditions. Among the areas of interest between the two entities will be expansion of modeling and simulation tools toward better understanding of evacuation planning, urban growth and infrastructure expansion, storm surge and flood modeling and wildfire modeling.

The mission of the LSU Hurricane Center is to advance the state-of-knowledge of hurricanes and their impacts on natural, built and human environments; to stimulate new interdisciplinary/collaborative research activities; to transfer this knowledge and technology to students and professionals in concerned disciplines; and to assist the state, the nation and the world in solving hurricane-related problems.



D.V. Rao, center, Decision Applications (D) Division leader, Steve Fernandez of Energy and Infrastructure Analysis (D-4) and Randy Erickson, right, D Division deputy leader, sign a memorandum of understanding with Louisiana State University. The MOU will team Lab researchers with staff from LSU's Hurricane Center on joint hurricane research projects. Photo by LeRoy N. Sanchez

"This is an outstanding opportunity for collaboration," said D.V. Rao, D Division leader. "There is an urgent, proven need for better tools to avoid, reduce and recover from the effects of hurricanes and other natural disasters. As we develop and perfect tools that can help so much, it simply makes sense to reach out to other experts and leverage our strengths. LSU will be an excellent partner in this area."

Participating scientists at both institutions will be involved in several meetings each year to discuss joint research and future pro-

posals, and a dedicated computer network will be set in place to enhance their collaborations. Students and professional staff will have the opportunity for short- and long-term visits between the two facilities and outreach will extend to other universities and agencies as the partnership matures.

The memorandum of understanding was signed by Rao, representing the Laboratory, and James Bates, director of the Office of Sponsored Programs at Louisiana State University and A & M College.

New technologies enhance quantum cryptography

by Todd Hanson

A team of Laboratory scientists, in collaboration with researchers from the National Institute of Standards and Technology in Boulder, Colo., and Albion College in Albion, Mich., have achieved quantum key distribution (QKD) at telecommunications industry wavelengths in a 50-kilometer (31 miles) optical fiber. The work could accelerate the development of QKD for

secure communications in optical fibers at distances beyond current technological limits.

In research published recently in Applied Physics Letters, the team describes the use of new superconducting transition-edge sensors (TES) to distribute cryptographic key material at wavelengths of 1,550 nanometers through 50 kilometers of optical fiber. TES could provide increases in range and performance over current QKD photon detection schemes. Unlike the single-photon sensitive avalanche photodiodes (APD) that are typically used in optical fiber QKD systems, TESs detect photons by measuring minute temperature increases in a superconducting material caused by the absorption of individual photons.

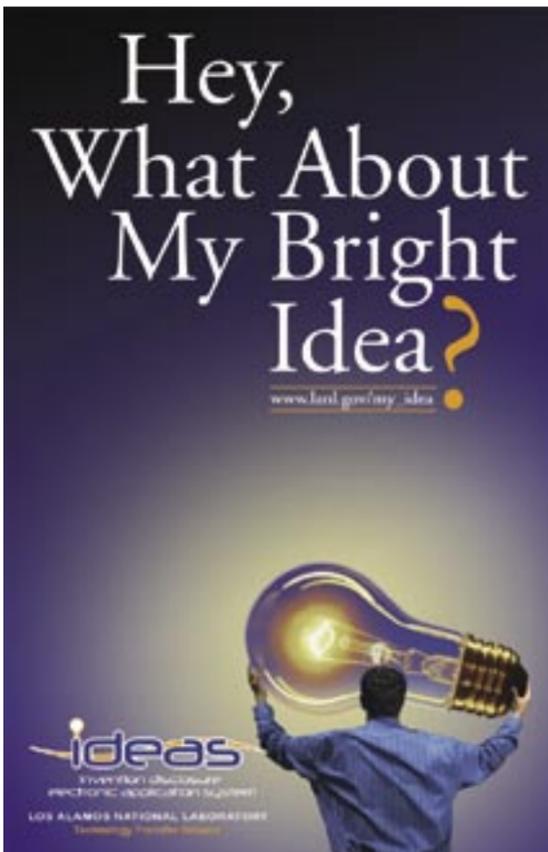
"The enhancements we've made center around a new method of detecting single photons, which can be one of the most challenging aspects of QKD," said Danna Rosenberg of Biological and Quantum Physics (P-21). "The TESs provide significantly higher detection efficiencies and lower dark count rates than those of typical APDs. The high efficiency and low probability of dark counts, coupled with the relatively short recovery time of TESs, should permit higher secret key transmission rates at longer distances than APD-based systems."

In addition to employing TESs, the team experimented with bright optical pulse and electrical signal synchronization schemes.

One method of synchronization involved sending a bright 1,310-nanometer pulse just before sending a 1,550-nanometer pulse. Using a bright pulse reduced transmission errors that might occur due to changes in the length or optical properties of the fiber link. An electrical synchronization scheme used a rubidium atomic clock to synchronize information senders and receivers.

When used with electrical synchronization schemes, the TESs have the potential to increase distances that optical fibers could be used for QKD. Using the current system, the maximum transmission distances for data with bright pulse and electrical synchronization are 83 kilometers (51.57 miles) and 138 kilometers (85.75 miles), respectively. More sophisticated methods of filtering photons than the experimenters employed, might someday allow users to send quantum keys securely over distances in excess of 270 kilometers (167.77 miles), compared to the current record of 122 kilometers (75.8 miles).

In addition to Rosenberg, who was formerly with the National Institute of Standards and Technology, the TES QKD team includes Philip Hiskett, Glen Peterson, Richard Hughes, and the team's leader, Jane Nordholt, all of P-21, and Sae Woo Nam, Adriana Lita and Aaron Miller at the National Institute of Standards and Technology in Boulder.



For Laboratory closures, delays or early dismissal information, call UPDATE at 667-6622 or 1-877-723-4101 (toll free).

So... what do you think?

Q: The senior management team for Los Alamos National Security, LLC, the new management contractor for the Laboratory, recently was announced (see the week of Jan. 30 Los Alamos National Laboratory Newsletter). What issue or issues would you personally like to see addressed first by the new Laboratory management team when it takes over June 1?



Jennifer Herrera of the Government Relations Office (CER-1)

What is really critical is that there needs to be some more clarification as to what nonprofit versus profit means.



Steve Knox of Research and Development (ISR-RD)

Business practices. Also the preservation of the core scientific strength of Los Alamos, which is what differentiates us from other laboratories and industry.



Andrea Sanchez of DARHT (DX-6)

I think security and procedure issues are the most important and should be addressed first and foremost.



Bob Gilbert of HR Workforce Strategy and Development (HR-WSD)

Working in recruitment, I would like to see a strong commitment to recruiting efforts looking for the best people to work here at the Laboratory.



Josiah England of the Advanced Computing Lab (CCS-1)

It would be nice to have an easier route for students to get into the Lab. Something easier than having the inside track.



Katherine Kramer of the HR Service Center (HR-SC)

I think they need to restructure [the Lab] in such a way that it promotes Los Alamos National Security, LLC business-wise so that the outside world sees us as accountable and moving forward.

PEOPLE



Fenimore new ISR-1 group leader



Edward Fenimore

Edward Fenimore is the new group leader for Space Science and Applications (ISR-1).

"I am honored to represent this incredible group, a group of people and projects that I have been associated with for more than 30 years. I am sure that they will continue to lead the Lab in scientific

and programmatic accomplishments," Fenimore said.

ISR-1 includes more than 100 people and involves all aspects of space science and applications. According to Fenimore, most of the work involves the conception, design, construction, testing, flying, and analyzing and publishing results of satellites developed at the Lab. However, the group also specializes in astrophysics, gamma-ray bursts, planetary studies, solar wind, magnetospheric physics and the building of systems that monitor space for nuclear weapons, according to Fenimore.

Fenimore holds a doctorate and master's degree in astronomy and astrophysics from the University of Chicago and a bachelor's degree in physics from the Rensselaer Polytechnic Institute. He began his career with the Laboratory in 1974 as a graduate research assistant finishing his thesis. He has been awarded the Los Alamos Distinguished Performance Award seven times and was named a Laboratory Fellow in 1998.

Lab scientist named 2006 Asian American Engineer of the Year



Ning Li

Los Alamos scientist Ning Li of Condensed Matter and Thermal Physics (MST-10) has been named the 2006 Asian American Engineer of the Year by the Chinese Institute of Engineers-USA. Li was recognized for his technical and programmatic leadership in developing an important heavy-liquid metal

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In Memoriam

Arthur N. Strein

Laboratory retiree Arthur N. Strein died Nov. 21, 2005. He was 83.

Strein came to Los Alamos in 1949 and worked in the former GMX Division as an optical design draftsman. At the time of his retirement in 1983, he worked in the former Design Engineering (WX) Division. He continued casual employment as a senior designer until 1988.

He is survived by his wife, Billie of Albuquerque; sons Robert and David of Albuquerque; Gary and wife Vicki of High Rolls, N.M.; sister Ruth Siekierka and husband Walter of Scranton, Pa.; sister-in-law Audra Swanson of Albuquerque; and numerous grandchildren, nieces, nephews and cousins.

Todd Heineman

Todd Heineman of Detonator Technology (DX-1) died Jan. 25. He was 46.

A veteran of the U.S. Navy, Heineman joined the Laboratory in February 1989 in the former Information Services (IS) Division. He also worked in the former Operational Security and Safeguards (OS) and Facilities, Security and Safeguards (FSS) divisions and for the Security and Safeguards (S) Division. Heineman joined the Dynamic Experimentation (DX) Division in 1999.

Heineman is survived by his son, Tim; mother, Carol of Tucson, Ariz.; sisters Holly of Los Alamos, Virginia Walker and Sarah Williams of Ohio; brothers Rob of Los Alamos and Rick of Perry Michigan; and numerous other relatives.

Alfred O. Paas

Laboratory retiree Alfred O. Paas died Dec. 3, 2005, after a lengthy illness. He was 71.

Paas began working at the Laboratory in 1976 with the former Design Engineering (WX) Division where he worked until his retirement in 1993.

He received a bachelor's in chemical engineering from Purdue University, then served in the Chemical Corps upon entering the Army in 1957. He later attended the Naval Postgraduate School and University of Illinois, receiving master's degrees in nuclear physics. He served in Vietnam in the early 1970s and retired from the Army as a lieutenant colonel.

Paas is survived by his wife, Deloris of Los Alamos; daughters Lisa of Campbell, Texas, Ingrid of Los Alamos and Laura of Viera, Fla.; son Robert of Athol, Mass.; stepmother Luise Paas of Palm Bay, Fla.; and numerous grandchildren and great-grandchildren.

Robert Padilla

Laboratory retiree Robert Padilla died Dec. 4, 2005. He was 73.

Padilla came to the Laboratory in 1967 and worked as a machinist in the former Shops Department (SD) and Mechanical Fabrication (MEC) Division until his retirement in 1989. He returned to the Laboratory as an associate until 1991.

He is survived by his wife, Ema of Penasco, N.M.; daughter Roberta Toledo of Albuquerque; sons Eddie and Michael Padilla of Los Alamos; stepdaughters Minerva Contreras of El Paso, Texas, and Sally Medina of Juarez, Mexico; stepson Benjamin Contreras and of Juarez, Mexico; and sister, Margie Espitia of Sandia Park, N.M. He is also survived by five grand-daughters, three great-grandsons and one great-grand-daughter.

Lab scientist ...

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nuclear coolant technology for advanced nuclear reactor and waste transmutation applications.

Li is the Laboratory's project and team leader for heavy liquid metal coolant technology and materials development and serves as an executive committee member of the Material Science and Technology Division of the American Nuclear Society. Li also is an adjunct professor in the mechanical engineering department at the University of Nevada, Las Vegas, and is a research affiliate in the nuclear science and engineering department at the Massachusetts Institute of Technology. He has authored 97 publications and technical reports and has received one patent.

Li earned his bachelor's degree in physics from the University of Science and Technology of China and arrived in the United States as a doctoral student in the Physics Department at the University of California, Santa Barbara. He conducted his thesis research under the tutelage of National Academy of Science Fellow, Professor Guenter Ahlers and Professor David Cannell, on pattern formation and selection in nonlinear dynamic systems.

The CIE-USA award recognizes established engineers who have made outstanding contributions to the engineering profession, the public welfare and/or humankind. This is the fifth consecutive year that a Los Alamos scientist has received the award. Previous Laboratory recipients are **Quanxi Jia**, **Wu-chun Feng**, **Joe Tise** and **Paul Pan**.

Li will be recognized at a banquet scheduled for Feb. 25 in Seattle, Wash.

Lab's public reading room moves to Research Library

The Laboratory's public reading room is now in the Research Library at Technical Area 3. It previously was located at the Community Relations Office (CER-30) in downtown Los Alamos.

The reading room features hard copy environmental documents, including annual reports, current permitting and environmental compliance documents for public review and some documents for background information on environmental issues.

Plans for the future include an electronic kiosk through which all environmental publications pertaining to the Laboratory will be accessible. Additionally, a Web site was created and, pending a security review using post Sept. 11, 2001 requirements, selected documents will be available at eweb.lanl.gov/Reading_Room.htm online.

The Research Library is part of Los Alamos' J. Robert Oppenheimer Study Center. It is open to the public from 9 a.m. to 4 p.m., Monday through Friday. For security reasons, visitors are required to sign in and out and show a valid identification, such as a driver's license.

For more information, write to readingroom@lanl.gov by e-mail or call the Research Library at 7-4448.



Eight named APS Fellows

Eight Laboratory technical staff members are 2005 Fellows of the American Physical Society. According to the APS Web site, fellows are recognized for their contributions to the physics community and research.

The Laboratory staff selected by APS are

- **Bruce E. Carlsten** of High Power Electrodynamics (ISR-6) for his contributions to the understanding of intense electron beams and for the development of techniques that have led to the achievement of ultra-bright electron sources.

- **Constantine Sinnis** of Neutron Science and Technology (P-23) for the development and use of ground-based telescopes to study high-energy gamma rays and cosmic rays from a variety of astrophysical sources.

- **Hui Li** of Applied Science and Methods Development (X-1) for his computational analysis of force-free reconnection, force-free helices as jets, angular momentum transport by vortices, gamma-ray bursts and electron acceleration, which have made significant contributions to plasma-astrophysics.

- **Jaroslav Majewski** of the Lujan Neutron Scattering Center (LANSCE-LC) for contributing to the understanding of structural properties of Languir films and model biomembranes at solid-liquid interfaces using x-ray and neutron scattering.

- **John Sarrao** of Materials Science and Technology Division Office (MST-DO) for his contributions to understanding the magnetism and unconventional superconductivity in strongly correlated f-electron systems, especially through the discovery and synthesis of new materials.

- **Roman Movshovich** of Condensed Matter and Thermal Physics (MST-10) for adding to the understanding of unconventional superconductivity and strongly correlated electron phenomena at very low temperatures.

- **Stephen Sheffield** of Shock and Detonation Physics (DX-9) for his contributions to shockwave physics. In particular, his development and implementation of the ORVIS interferometer for measuring kinetics and CJ parameters of detonating explosives and his studies of reactions in shocked liquid CS₂.

- **William Priedhorsky** of the International, Space and Response Division Office (ISR-DO) for his discoveries in X-ray astrophysics, leadership in instruments to monitor the X-ray sky and broaden the wavelength coverage of space observatories, and applications of astrophysics to problems in national security.

Robert Duncan, a Laboratory affiliate with the Los Alamos Neutron Science Center (LANSCE), was also elected as an APS Fellow for his pioneering advances in experimental studies of dynamic critical phenomena near the superfluid transition of ⁴He. He also was recognized for the development of novel instrumentation and measurement techniques for use on Earth and in space.

The Fellowship Program was created by APS to recognize members of the physics community who have made advances in the physics field through original research and publication, made significant and innovative contributions in the application of physics to science and technology, or made outstanding contributions to the teaching of physics or service and participation in the activities of the APS.

The American Physical Society was founded in 1899 with a mission to advance and disseminate the knowledge of physics. In addition to overseeing physics focused publications, the APS is actively engaged in the public, government and international physics community, as well as in education programs and public outreach.

The newly appointed fellows will receive a certificate and lapel pin from APS.



NNSA recognizes Immele for distinguished service

Laboratory Deputy Director for National Security John Immele listens as David Crandall, right, of the National Nuclear Security Administration makes some comments at a presentation in the Otowi Building at Technical Area 3. Immele retired from the Laboratory but plans to return as a guest scientist. Immele came to Los Alamos from Lawrence Livermore National Laboratory in December 1988. Crandall is a NNSA deputy administrator for research, development and simulation. The plaque presented to Immele notes the NNSA Gold Medal Immele received for more than 25 years of distinguished service at both Los Alamos and Lawrence Livermore national laboratories. The plaque was signed by Linton Brooks, NNSA administrator. Photos by LeRoy N. Sanchez





Lab trainer crosses borders to help others learn

by Hildi T. Kelsey

A group of 64 middle school teachers from a remote coal mining community in the mountains of northwestern China shuffle eagerly into the courtyard of Public School No. 18, line up in rows and patiently await further instruction. Upon seeing such a gathering for the first time, an outside observer might wonder why these individuals have assembled and what is going to take place next. To his or her surprise, the answers to those questions would come quickly — not in the form of a long-winded explanation or visual display, but in the words to a simple and well-known children's song — “Head, Shoulders, Knees and Toes.”

According to Dan Gabel of Enterprise Support and Computer Education (IM-2), gathering for the morning song is a daily routine at the school designed to help teachers practice speaking in English. With the students at home from school celebrating a national holiday, Gabel, who traveled to China specifically to teach English, and other volunteers worked diligently last Oct. 1 through 8 to help those teachers who “taught English but spoke it poorly” hone their skills.

Gabel, who does not speak Chinese, and his co-instructor worked with a group of 14 teachers, many of whom were experts in other academic subjects, but had little or no background in teaching English.

“Four of the teachers in the class had been teaching English less than three weeks. They were overwhelmed by it. I was able to encourage these teachers by telling them that the first year of teaching is the hardest, but the skills they will pick up as public school teachers will help them in everything they do,” he said.

Mostly, Gabel said he was struck by the gratefulness of the teachers who were happy for the opportunity to practice English. The structure of the lessons utilized various methodologies to allow such rehearsal in a variety of formats. Teachers were even treated to a showing of the “Sound of Music” in English with English subtitles.

“We had class in the morning and activities in the afternoon. The teachers worked in pairs, and we focused on cultural exchange topics such as money, holidays and festivals,” said Gabel. “We tried to facilitate discussions, play games and, of course, there was the singing — they loved to sing.”

Over the course of the week, Gabel said he witnessed a lot of development and confidence-building within his class. He was particularly impressed with the progress of a teacher named Candy (her American



Dan Gabel of Enterprise Support and Computer Education (IM-2), far left, is pictured with Chinese middle school teachers from a remote community in the mountains of northwestern China. Gable recently returned from a two-week trip to this rural area, where he taught conversational English to the teachers. Above photo courtesy of Gabel; photo of Gabel at left by LeRoy N. Sanchez



name) who he described as frustrated and almost bitter about teaching at first. “By the end of the week her demeanor changed completely,” he said. “At the end of the class she gave me a gift and a note thanking me for the encouragement and stating ‘this class was the happiest time of my life.’”

While Gabel reflected fondly on many aspects of his

trip, he maintains that one of the highlights of his experience was on the last day of teaching when he and the other instructors met with 400 senior high school students who came back early from vacation to study for their college entrance exams. At the assembly, Gabel led the students in singing the classic Disney tune, “It’s a Small World After All.” After the gathering, instructors and students had a chance to mingle during an informal question-and-answer session that Gabel described as “a lot of fun.”

It is no surprise that the teachers/students responded favorably to Gabel. An instructor and teacher for 35 years, his skills evolved over time through education and practical work experience. Of his teaching philosophy, Gabel said, “I like to teach by analogy — to take something new and relate it to something students already have experience with to help them understand it.”

Gabel earned bachelor’s degrees in chemistry and math from Dakota Wesleyan University in South Dakota in 1970 and a master’s of physics from Washington State

University in 1972. He was so impressed with his physics professor that he decided to also “pick up” teaching credentials. Gabel taught seventh grade science and high school chemistry and physics for two years in Iowa and went on to teach high school physics and chemistry in California for seven years.

Then, Gabel said, the Three-Mile Island disaster motivated him to “go into the nuclear power industry,” teaching reactor physics and thermodynamics to plant operators for Southern California Edison for seven years. With the computer revolution starting to take hold, Gabel subsequently decided to train on computers and received his certification as a technical trainer in software. He took an early retirement from Edison to be an instructor dealing with personal computers and software topics for the state of California, Department of Justice. Afterward, Gabel went on to work for Oracle, training students on database technology and programming. While traveling on business for the company, he came to Los Alamos to teach courses and “liked it here.”

In March 2004, Gabel was hired in IM-2 to train employees on the Lab’s business systems. When he first arrived, Gabel worked on the Enterprise Project releases, such as Accounts Payable Release 1. He currently conducts procurement systems training and also instructs employees on using the legacy system, including how to submit requests for domestic and foreign travel.

But, teaching isn’t just a job for Gabel, who also is a certified flight instructor. Helping others learn is at the core of his personality and permeates everything he does. “When you can see a visible difference and know you helped people, it is one of the best feelings you can have,” he said.